Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Improving The Wireless Resiliency Cooperative Framework	)	PS Docket No. 11-60
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COMMENTS OF CTIA

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To: Public Safety and Homeland Security Bureau

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CTIA[1] submits these comments in response to the *Public Notice*[2] issued by the Public Safety and Homeland Security Bureau (Bureau) regarding improving the Wireless Resiliency Cooperative Framework (Wireless Resiliency Framework or Framework).[3]

I. INTRODUCTION AND SUMMARY.

CTIA and its member companies share the Commission's significant and ongoing commitment to strong and robust wireless network resiliency and recovery efforts. We know that in the face of disasters and emergencies, consumers depend on mobile wireless services more than ever. CTIA's member companies thus remain focused on building increasingly

[1] CTIA® (www.ctia.org) represents the U.S. wireless communications industry and the companies throughout the mobile ecosystem that enable Americans to lead a 21st- century connected life. The association's members include wireless carriers, device manufacturers, suppliers as well as apps and content companies. CTIA vigorously advocates at all levels of government for policies that foster continued wireless innovation and investment. The association also coordinates the industry's voluntary best practices, hosts educational events that promote the wireless industry, and co-produces the industry's leading wireless tradeshow. CTIA was founded in 1984 and is based in Washington, DC.

[2] *Public Safety and Homeland Security Bureau Seeks Comment on Improving the Wireless Resiliency Cooperative Framework,* DA 19-242 (rel. Apr. 1, 2019) (*Public Notice*).

[3] Letter from Joan Marsh, AT&T Services, Inc.; Charles McKee, Sprint; Grant Spellmeyer, U.S. Cellular; Scott Bergmann, CTIA; Steve Sharkey, T-Mobile USA; and William H. Johnson, Verizon, to Marlene H. Dortch, Secretary, Federal Communications Commission, PS Docket Nos. 11-60 & 13-239 (Apr. 27, 2016) (Wireless Resiliency Framework Letter) (submitted for filing by CTIA).

resilient wireless networks and accelerating the timeline for restoration of service in any areas impacted by a disaster or emergency. The wireless industry's efforts to advance network resiliency represent an ongoing endeavor and include network investments, enhanced coordination brought about by the Wireless Resiliency Framework, and the regular assessment of disaster experiences and execution of new lessons learned – actions that occur today and will continue tomorrow.

The wireless industry's ongoing efforts for improving wireless resiliency are focused on two flexible and voluntary initiatives that have proven successful in recent years. First, wireless providers are continually identifying lessons learned from storms and developing practices to prepare for future storms. These steps, which date back to Hurricane Katrina, have already yielded substantial investments by the wireless industry to help strengthen and harden wireless networks and improve network resiliency planning and practices. And second, the development and ongoing implementation of the Wireless Resiliency Framework, a voluntary initiative developed by industry in collaboration with congressional leaders and the Federal Communications Commission (Commission), is building on these investments to further enhance service continuity and information sharing.

As a result of these ongoing actions, consumers largely were able to rely on wireless services to seek help and aid their recovery despite severe and varying conditions presented by recent storms. Indeed, millions of consumers used wireless service to call and text loved ones, connect with emergency personnel, receive important safety alerts, and seek and offer support with their community through social media. For example:

- In Texas and Louisiana, at least 95 percent of cell sites in the areas affected by Hurricane Harvey maintained operations.[4]

- In Louisiana, only six cell sites went down as a result of Hurricane Harvey,[5] despite the storm dropping over 17 inches of rain near Lake Charles.[6]

- Even in response to the unprecedented conditions presented by Hurricane Michael (recently upgraded to a Category 5, the first such storm to hit the contiguous United States since 1992[7]), the percentage of cells sites in service in the total affected areas never fell below approximately 81 percent on a given day.[8]

And in those cases where networks were affected, the wireless industry worked around the clock to restore services as quickly as possible. For instance, despite initial cell site outages in the initial days following Hurricane Irma, approximately 92 percent of cell sites overall were operational in affected areas five days after landfall.[9] This resiliency allowed local Florida officials to urge residents to use mobile apps for shelter, power outage, gas station, and traffic updates during and after Hurricane Irma.[10]

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[4] *See* CTIA Comments, PS Docket No. 17-344, at 5 (Jan. 22, 2018) (CTIA 2017 Hurricane Season Comments).

[5] FCC, Communications Status Report for Areas Impacted by Post-Tropical Cyclone Harvey, at 3 (Sept. 2, 2017), https://apps.fcc.gov/edocs_public/attachmatch/DOC-346477A1.pdf.

[6] Weather.com, Historic Hurricane Harvey's Recap (Sept. 2, 2017), https://weather.com/storms-/hurricane/news/tropical-storm-harvey-forecast-texas-louisiana-arkansas.

[7] National Oceanic and Atmospheric Administration, Hurricane Michael upgraded to a Category 5 at time of U.S. landfall (Apr. 19, 2019), https://www.noaa.gov/media-release/hurricane-michael-upgraded-to-category-5-at-time-of-us-landfall.

[8] *See*, FCC, Communications Status Report for Areas Impacted by Hurricane Michael, at 1 (Oct. 13 2018), https://docs.fcc.gov/public/attachments/DOC-354533A1.pdf (noting that the percentage of cells sites out of service dropped from 18.8% to 7.8% in the three days following Hurricane Michael's landfall).

[9] FCC, *Communications Status Report for Areas Impacted by Hurricane Irma*, at 3 (Sep. 15, 2017), https://apps.-fcc.gov/edocs_public/attachmatch/DOC-346754A1.pdf.

[10] *See, e.g.*, City of Sunny Isles Beach, Resources for Residents & Businesses Post-Hurricane Irma, https://www.sibfl.net/resources-for-residents-post-hurricane-irma/ ("Residents should use mobile apps for County services, power outages, gas stations and traffic updates.").

Yet, efforts to enhance resiliency and service continuity are never finished. CTIA and its member companies regularly take stock of lessons learned from recent storms and identify targeted steps to further enhance resiliency. These steps include increased information sharing with federal stakeholders and enhanced coordination between wireless providers and power companies. The Bureau should continue to facilitate these flexible, voluntary steps and avoid the types of rigid metrics and mandates that were unanimously rejected by the Commission less than three years ago.

II. THE WIRELESS RESILIENCY FRAMEWORK PROVED AN EFFECTIVE TOOL IN FURTHER ADVANCING WIRELESS SERVICE CONTINUITY AND RESTORATION DURING THE 2017 AND 2018 HURRICANE SEASONS.

A. Investments by the Wireless Industry, Informed By Lessons Learned From Previous Storms, Have – and Will Continue to – Enhance Resiliency and Preparedness.

As CTIA previously has explained, investments by the wireless industry to enhance network resiliency began well before the development of the Framework.[11] Indeed, following Hurricane Katrina, Superstorm Sandy, and other catastrophic storms, wireless providers took stock, identified lessons learned, and developed practices to prepare for future storms. These efforts have resulted in substantial investments by wireless providers to help harden networks and improve resiliency planning and practices.

These investments take many different forms. For example, wireless network operators tailor the design, deployment, and management of robust, resilient networks to each unique region of the country. Operators in the southern regions of the United States design networks to account for hurricanes, flooding, and other similar disasters that are more common in this region,

[11] *See, e.g.*, CTIA Comments, PS Docket No. 11-60, at 9-12 (Jul. 16, 2018). Hereinafter, all cites to comments refer to comments filed in PS Docket No. 11-60 unless otherwise noted.

while operators in California design networks for earthquakes.[12] These steps help keep critical network assets out of harm's way in numerous instances.[13] And where infrastructure is affected, wireless providers are able to maintain service continuity and expedite the restoration of service by pre-positioning assets and dedicated teams trained to implement formal and informal recovery practices. With the benefit of lessons learned from previous disasters, proactive steps such as these are improving network resiliency and restoration.

Last year many wireless providers detailed to the Commission their efforts to strengthen the resiliency of their networks and expedite service restoration.[14] AT&T has "invested billions of dollars in [its] network to help plan and prepare for emergencies."[15] Sprint "maintains significant resources to help respond to disasters, including on-the-ground, trained technicians, portable diesel generators, specialized repair vehicles, [COWs], and predesignated strategic locations for staging equipment and other resources."[16] T-Mobile "pre-stages assets (including

[12] *See*, *e.g.*, Comments of Verizon, PS Docket No. 17-344, at 4 (Jan. 22, 2018) (Verizon Comments) ("Verizon considers the likelihood of hurricanes and other natural disasters in an area to choose the safest, most secure locations for wireless equipment"); Comments of T- Mobile USA, Inc., PS Docket No. 17-344, at 7-8 (Jan. 22, 2018) (T-Mobile Comments) (noting that T-Mobile builds cell sites on platforms in areas of Texas prone to flooding and storm surges); Letter from Kara Leibin Azocar, Regulatory Counsel, Federal Affairs, GCI Communication Corp., to Public Safety and Homeland Security Bureau, Federal Communications Commission, PS Docket No. 11-60, at 1 (Nov. 26, 2018) (describing how GCI has developed and deployed its network based on GCI's understanding of the Alaskan environment).

[13] Verizon Comments at 4-5 (noting that 98 percent of Verizon's network facilities in the hardest hit areas of Texas remained in service during and after Hurricane Harvey as a result of a wide variety of methods and practices Verizon has implemented to increase network resiliency); T-Mobile Comments at 7 (noting that 85 percent of T-Mobile's network remained operational during and in the aftermath of Hurricane Harvey).

[14] *See* CTIA Comments, PS Docket No. 18-339, at 8-11 for an expanded summary of these filings.

[15] Letter from Joseph P. Marx, Assistant Vice President, AT&T Services, Inc., to Lisa M. Fowlkes, Chief, Public Safety and Homeland Security Bureau, Federal Communications Commission, PS Docket No. 11-60, at 1 (Nov. 26, 2018) (AT&T Resiliency Response).

[16] Letter from Charles W. McKee, Vice President, Government Affairs, Sprint, to Lisa M. Fowlkes, Bureau Chief, Public Safety and Homeland Security Bureau, Federal Communications Commission, PS Docket No. 11-60, at 2 (Nov. 26, 2018).

mobile generators, COWs, and COLTs), temporary microwave/satellite communications, and supplies (including fuel)" and "mobilizes expert recovery and restoration teams, completes internal preparedness checklists to ensure readiness, and coordinates with vendors that may be used in the recovery process" in advance of major storms.[17] And Verizon's approach includes "preparing for disasters before they hit; communicating with [its] customers and government policyholders before, during, and after such disasters; and restoring and repairing [its] networks as quickly and safely as possible."[18]

Non-nationwide wireless providers are also investing in network resiliency and restoration efforts. For example, U.S Cellular's normal operating procedures include coordinating with all four national wireless providers to facilitate the provisioning of any mutual aid that may be needed as a result of the weather event.[19] SouthernLINC has created an incident support team, which is comprised of subject matter experts from all of its departments, that implements emergency processes and procedures as severe weather approaches.[20] And GCI has developed and deployed its wireless network based on its familiarity with the unique demands of the Alaskan environment and its understanding of the needs of Alaskans.[21]

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[17] *See* Response of T-Mobile USA, Inc., PS Docket No. 11-60, at 7 (Nov. 26, 2018) (T-Mobile Resiliency Response).

[18] Verizon's Response to Letter from Lisa M. Fowlkes, Chief, Public Safety and Homeland Security Bureau, to William H. Johnson, Senior Vice President., Verizon, PS Docket No. 11-60, at 1 (Nov. 26, 2018).

[19] Letter from Grant B. Spellmeyer, Vice President – Federal Affairs & Public Policy, U.S. Cellular, to Marlene H. Dortch, Secretary, Federal Communications Commission, PS Docket No. 11-60, at 1 (Nov. 26, 2018).

[20] SouthernLINC Wireless Resiliency Framework Response, PS Docket No. 11-60, at 1 (Nov. 26, 2018).

[21] Letter from Kara Leibin Azocar, Regulatory Counsel, Federal Affairs, GCI Communication Corp., to Public Safety and Homeland Security Bureau, Federal Communications Commission, PS Docket No. 11-60, at 2 (Nov. 26, 2018). GCI also notes that it does not provide network operations in any of the area impacted by Hurricane Michael. *Id.* at 1.

These investments helped advance resiliency in response to the significant storms in 2017 and 2018. Moreover, these efforts are ongoing. Just as the wireless industry has done following earlier storms, wireless providers regularly review the performance of networks in response to recent hurricanes and make investments to prepare for the challenges posed by future events.

B. The Wireless Resiliency Framework Builds on These Investments to Advance Wireless Service Continuity and Expedite Service Restoration.

The Wireless Resiliency Framework builds on the above investments by identifying key actionable steps to advance wireless service continuity, expedite service restoration, and enhance information sharing. The Framework was developed in the aftermath of Superstorm Sandy when current House Energy and Commerce Chairman Frank Pallone, Jr. (D-NJ), Commission staff, and CTIA convened to find ways to improve the resiliency of the nation's wireless communications networks. Through months of discussions, the parties developed the Wireless Resiliency Framework, a voluntary initiative which contains five prongs to improve safety and enhance coordination during and after emergencies.

The flexible approach adopted in the Framework equips wireless providers with a set of tools to utilize as appropriate in responding to the unique nature of each event. The nation's five largest facilities-based wireless providers, AT&T, Sprint, T-Mobile, U.S. Cellular, and Verizon, all voluntarily committed to adopt the Framework at the time of its announcement in 2016.[22] GCI and SouthernLINC similarly volunteered to participate in the Framework later that same year, and the Competitive Carriers Association filed its support of the Framework and "commit[ted] to many of the same principles…."[23]

[22] *See* Wireless Resiliency Framework Letter.

[23] *See* Letter from Kara Azocar, Regulatory Counsel, Federal Affairs, GCI Communication Corp., to Marlene H. Dortch, Secretary, Federal Communications Commission, PS Docket No. 11-60 (Sept. 1,

Government and public safety stakeholders alike commended the Framework. Chairman Pallone hailed the Wireless Resiliency Framework as an agreement that "will save lives during major emergencies like Superstorm Sandy" and praised industry and the Commission for working "to craft a comprehensive agreement that ensures consumers have access to wireless service during an emergency even if their wireless network goes down."[24] Similarly, the Association of Public-Safety Communications Officials-International, Inc. told the Commission that the Framework "can lead to great improvements to wireless network resiliency, restoration, and overall preparedness and response, in disaster situations."[25]

The Commission embraced the Framework's flexibility and rejected a more prescriptive approach. Following the announcement of the Framework, the Commission unanimously adopted an order finding the Framework's voluntary approach "a more appropriate path forward for improving wireless resiliency and provider transparency" than the use of numerical metrics that the Commission initially had proposed, and terminated its docket in which metrics had been proposed.[26] Then-Commissioner Ajit Pai praised the Commission's decision, stating that the prescriptive approach initially proposed was misguided, and the voluntary approach captured in

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2017); Letter from Michael Rosenthal, Director of Legal & External Affairs, SouthernLINC, to Marlene H. Dortch, Secretary, Federal Communications Commission, PS Docket No. 11-60 (Sept. 5, 2017); Letter from Rebecca Murphy Thompson, EVP & General Counsel, Competitive Carriers Association, to Marlene H. Dortch, Secretary, Federal Communications Commission, PS Docket Nos. 11-60 & 13-239, at 1 (May 31, 2016).

[24] Press Release, Congressman Frank Pallone, Jr., *CTIA & Pallone Announce "Wireless Network Resiliency Cooperative Framework" for Disasters and Emergencies* (Apr. 27, 2016), https://energycommerce.house.gov/newsroom/press-releases/ctia-pallone-announce-wireless-network-resiliency-cooperative-framework-for.

[25] Comments of APCO, PS Docket Nos. 11-60 & 13-239, at 3 (May 31, 2016).

[26] *Improving the Resiliency of Mobile Wireless Communications Networks*, Order, 31 FCC Rcd 13745, ¶ 1 (2016) (*Mobile Wireless Resiliency Order*).

the Framework was "a far more appropriate path than the one the FCC originally charted."[27] As described below, the responses to the unique and unprecedented storms of 2017 and 2018 demonstrate that the Commission was right to adopt a flexible approach.

III. THE FLEXIBLE APPROACH ADOPTED IN THE WIRELESS RESILIENCY FRAMEWORK HELPED WIRELESS PROVIDERS MAINTAIN AND RESTORE SERVICE IN THE FACE OF VARYING STORM CONDITIONS.

The wisdom of the Framework's flexible, voluntary approach was brought into clearer focus in 2017 and 2018 when a set of historic hurricanes hit various communities across the country. Each of these storms presented its own unique set of challenges. And in each instance, previous investments by the wireless industry combined with the flexible tools identified in the Framework enhanced the preparedness of providers. Ultimately, this approach helped keep consumers connected and addressed many of the needs of communities affected by these events.

A closer examination of the vastly different experiences presented by Hurricanes Harvey, Maria, and Michael bear this out. Hurricane Harvey's historic flooding caused widespread damage through affected areas in Texas and Louisiana. All told, the storm caused approximately $125 billion in damage, making it the second costliest hurricane to ever strike the United States.[28] Yet, despite this destruction, prior investments in the design and deployment of wireless networks contributed to remarkably resilient service during and in the aftermath of this storm. As previously noted, at least 95 percent of cell sites in the areas affected by Hurricane

[27] Statement of Commissioner Ajit Pai, FCC 16-173 (Dec. 20, 2016) (regarding *Mobile Wireless Resiliency Order*).

[28] *See* National Oceanic and Atmospheric Administration, Hurricane Costs, https://coast.noaa.gov/states/fast-facts/hurricane-costs.html ("It is estimated that Hurricane Harvey had total costs of $125 billion—second only to Hurricane Katrina in the period of record, which had an approximate cost of $161 billion.).

Harvey remained in operation during the storm.[29] And, as the City of Houston told the Commission, in the rare instances in which service interruptions did occur, those services were restored in as short as "a few hours" in some cases.[30]

Federal and local authorities leveraged the resiliency of wireless networks during Hurricane Harvey to communicate important messages to the public. For example, the National Weather Service and local alerting authorities sent over 300 Wireless Emergency Alerts warning residents in and around Houston about Hurricane Harvey and its rising floodwaters.[31] Similarly, the City of Houston reported that wireless networks enabled the deaf and hard of hearing community to text-to-911 on mobile devices.[32]

And just as importantly, the Framework's flexibility enabled wireless providers to tailor their relief efforts to the unique needs of those communities affected Hurricane Harvey. For example, Verizon deployed five emergency response vehicles to communities affected by Harvey to distribute devices and supplies and provide charging stations.[33] Moreover, all four nationwide providers waived call, text, and data overages for customers located in affected areas, and all made significant charitable contributions to assist impacted communities in their recovery and rebuilding efforts.[34]

The conditions presented by Hurricane Maria were very different than the conditions during Hurricane Harvey. Hurricane Maria was the most intense hurricane to hit Puerto Rico

[29] *See* CTIA 2017 Hurricane Seasons Comments at 5.

[30] City of Houston Comments at 6.

[31] *See* CTIA 2017 Hurricane Seasons Comments at 5.

[32] See Comments of City of Houston, PS Docket 17-344, at 4-5 (Jan. 22, 2018).

[33] VERIZON, Hurricane Harvey by the Numbers, https://www.verizon.com/about/sites/default/files/HarveyFInal11117.pdf.

[34] *See* CTIA 2017 Hurricane Season Comments at 13-17 (discussing the contributions wireless providers made to communities affected by the 2017 hurricanes).

and the U.S. Virgin Islands in nearly a century. The storm's devastating conditions knocked out power to the entire island of Puerto Rico for months, severely impacting communications and transportation channels and making on-the-ground coordination challenging.

Yet, despite these different conditions, the wireless industry's approach to resiliency aided service continuity and restoration efforts there, too. Wireless providers serving Puerto Rico and the U.S. Virgin Islands implemented disaster-based roaming arrangements facilitated by the Framework, helping to make service available to as many consumers as possible. Providers also fostered mutual aid to one another to help with service restoration. This aid came in many forms, including one instance in which a provider shared space on its cargo plane to help transport a generator to Puerto Rico.[35] And thanks to the flexibility provided under the Framework, wireless providers were able to experiment with new and innovative measures – such as flying cell sites and cells on hot air balloons – to restore connectivity in the aftermath of this disaster.[36]

Hurricane Michael presented yet another set of unique challenges. This historic storm, recently classified as a Category 5 hurricane, was the third-strongest to ever strike the United States mainland, the most powerful ever recorded in the Florida panhandle.[37] The storm inflicted widespread damage in communities in Florida and tornado-like damage on areas in its path

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[35] *See*, Letter from Steve Sharkey, Vice President, Technology and Engineering Policy et al., T-Mobile, to Marlene H. Dortch, Secretary, Federal Communications Commission, PS Docket No. 17-344 (Jan. 8, 2017).

[36] *See*, Rob LeFebvre, *AT&T's 'Flying COW' drone provides cell service to Puerto Rico*, Engadget (Nov. 6, 2017), https://www.engadget.com/2017/11/06/att-flying-cow-drone-cell-service-puerto-rico/; Monica Alleven, *T-Mobile Joints AT&T in Collaborating with Project Loon in Puerto Rico*, Fierce Wireless (Oct. 28, 2017), https://www.fiercewireless.com/wireless/t-mobile-joins-at-t-collaborating-project-loon-puerto-rico.

[37] *See*, Laura Wamsley, *Hurricane Michael Was A Category 5, NOAA Finds — The First Since Andrew In 1992*, NPR (Apr. 19, 2019), https://www.npr.org/2019/04/19/715134716/hurricane-michael-was-a-category-5-noaa-finds-the-first-since-andrew-in-1992.

further north. Overall, past investments by wireless providers to strengthen networks paid dividends, as the percentage of cell sites in service in the total affected areas never fell below approximately 81 percent on a given day.[38] The percentage of cell sites in service in affected areas in Alabama, a state which experienced an estimated $307 million in damage, remained above 90 percent in the days following the storm.[39] Similarly, in the impacted areas of Georgia, a state in which more than 400,000 residents lost power due to Hurricane Michael, the percentage of cell sites in service never fell below 85 percent in the aftermath of the storm.[40]

Yet, the experiences in those communities located directly in Hurricane Michael's path reflected the unprecedented nature of this storm. For example, the ground-zero location of Mexico Beach, Florida was almost completely "flattened" by the storm's winds.[41] Most infrastructure, including buildings and electric lines, and many wireless equipment installations, were significantly affected by Hurricane Michael.[42] When outages affected these communities, the Framework aided efforts to maintain and restore service by facilitating at least one disaster-based roaming arrangement between wireless providers.[43] Wireless providers also implemented

[38] *See*, FCC, Communications Status Report for Areas Impacted by Hurricane Michael, at 1 (Oct. 13 2018), https://docs.fcc.gov/public/attachments/DOC-354533A1.pdf (noting that the percentage of cells sites out of service dropped from 18.8% to 7.8% in the three days following Hurricane Michael's landfall).

[39] *See* Dennis Pillon, *Hurricane Michael cost Alabama estimated $307 million, 2,500 jobs*, AL.com (Nov. 1, 2018), https://www.al.com/news/2018/11/hurricane-michael-cost-alabama-estimated-307-million-2500-jobs.html; FCC, Communications Status Report for Areas Impacted by Hurricane Michael, at 3 (Oct. 11 2018) (FCC Oct. 11 Status Report), https://docs.fcc.gov/public/attachments/DOC-354510A1.pdf.

[40] *See* Arielle Kass, *'Catastrophic damage' to power grid in Georgia after Hurricane Michael*, ATLANTA JOURNAL-CONSTITUTION (Oct. 11, 2018), https://www.ajc.com/news/local-govt--politics/more-than-300-000-are-without-power-georgia-after-hurricane-michael/wJrbPoaiGfgSjqaLL4m01K/; FCC Oct. 11 Status Report at 6.

[41] Jay Reeves & Tamara Lush, *It's 'Gone': How Hurricane Michael Swiftly Flattened One Florida Town*, YAHOO (Oct 11, 2018), https://www.yahoo.com/news/apos-apos-gone-apos-hurricane-212442398.html.

[42] *Id.*

[43] AT&T Resiliency Response, App. at 45.

the Best Practices for Enhancing Emergency and Disaster Preparedness and Restoration before, during, and after Hurricane Michael, resulting in at least one wireless provider being recognized for its responsiveness during the storm by Florida officials at both the state and county level.[44] And just like in the aftermath of Hurricane Maria, wireless providers leveraged the Framework's flexibility to deploy new and innovative solutions – such as cells on drones and cells on manned aerial vehicles – to help extend wireless coverage in some of the hardest hit communities.[45]

And lessons learned from previous storms helped to expedite service restoration. By taking steps such as pre-positioning resources nearby, wireless providers successfully restored services in even those hardest hit areas on expedited timeframes. The percentage of total cell sites in service in the total affected areas rose from approximately 81 percent on October 11 to approximately 94 percent on October 14 and to 97 percent on October 17.[46] Even in Florida's Bay County and Gulf County – the two counties most severely affected by Hurricane Michael – approximately 88 percent and 86 percent of cell sites, respectively, were operational by the time the Commission deactivated the Disaster Information Reporting System (DIRS) for Florida on October 26, 2018.[47]

These examples highlight the benefits of the current flexible and voluntary two-pronged approach for enhancing resiliency.

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[44] AT&T Resiliency Response at 1-2.

[45] AT&T, Response to Hurricane Michael, *AT&T's Flying COW Deployed to Hard-Hit Mexico Beach*, (Oct. 17, 2018) https://about.att.com/pages/hurricane_michael; Verizon, Hurricane Michael network updates, Network Update (Oct. 17, 2018, 10:00 AM) https://www.verizon- .com/about/news/hurricane-michael-network-updates.

[46] FCC Oct. 11 Status Report at 4; FCC, Communications Status Report for Areas Impacted by Hurricane Michael, at 1 (Oct. 14, 2018), https://docs.fcc.gov/public/attachments/DOC-354534A1.pdf; FCC, Communications Status Report for Areas Impacted by Hurricane Michael, at 1 (Oct. 17, 2018), https://docs.fcc.gov/public/attachments/DOC-354617A1.pdf.

[47] FCC, Communications Status Report for Areas Impacted by Hurricane Michael, 3 (Oct. 26, 2018), https://docs.fcc.gov/public/attachments/DOC-354814A1.pdf.

IV. WIRELESS PROVIDERS CONTINUE TO IDENTIFY AND EXECUTE ON LESSONS LEARNED FROM RECENT STORMS TO FURTHER IMPROVE NETWORK RESILIENCY AND RESTORATION.

Wireless resiliency is an ongoing activity, and the wireless industry takes stock after each disaster and emergency, identifying lessons learned and collaborating to prepare for the challenges posed by future storms. Each of the hurricanes of 2017 and 2018 not only presented its own set of unique challenges, but provided case studies to assess and improve approaches to resiliency. CTIA and its members are committed to continuing to identify such targeted improvements moving forward.

For example, the four nationwide wireless providers already are taking steps to further improve information sharing. In the Framework, signatories committed to support the FCC by making certain DIRS data available regarding the total number of cell sites out of service in an affected area. More recently, however, the four nationwide wireless providers committed to make additional service availability data available to Commission staff during and in the aftermath of an emergency or disaster. This latest commitment will aid Commission staff in assessing the status of wireless networks during and in the immediate aftermath of a significant event.

Separately, Hurricane Michael highlighted the need to enhance coordination with power companies before, during, and in the aftermath of disasters and emergencies. In the race to restore critical service, there have been occasions where wireless providers and power companies inadvertently operated at cross purposes – for example, even as wireless providers repaired networks, power company crews accidentally damaged fiber in those same areas, resulting in new outages. CTIA and its members already are working to address these challenges. For example, earlier in this proceeding, CTIA and a number of its members shared their thoughts

with the Bureau on steps that would facilitate greater cross-industry coordination.[48] In addition, wireless industry representatives are actively leading efforts within the Commission's Broadband Deployment Advisory Committee's Disaster and Recovery Working Group to develop a set of recommendations to improve coordination with power companies. And of course, wireless providers continue to participate in coordination efforts led by the Department of Homeland Security's National Coordination Center for Communications.

In addition to these government-led initiatives, CTIA is exploring how the wireless industry can better coordinate with utility stakeholders. Through these efforts, we hope to identify steps that wireless providers and power companies can take to better coordinate service continuity and restoration as part of preparation and recovery procedures.

Ongoing adjustments such as these have proven remarkably effective at enhancing resiliency efforts. CTIA and its member companies are committed to further advancing wireless service resiliency, and we look forward to working collaboratively with the Commission to achieve this shared goal.

V. A FLEXIBLE, VOLUNTARY APPROACH, RATHER THAN RIGID MANDATES AND METRICS, WILL AID CONTINUING EFFORTS TO IMPROVE WIRELESS NETWORK RESILIENCY.

As the Bureau reviews the record in this proceeding, the benefits of the Commission's carefully calibrated approach to wireless network resiliency should remain front of mind. By focusing on encouraging providers to continue to invest in wireless resiliency, the Commission's policies have yielded substantial investments by wireless providers to help strengthen and harden wireless networks and improve network resiliency planning and practices. Similarly, by

[48] *See, e.g.*, CTIA Comments, at 8-10 (Feb.8, 2019); CTIA Reply Comments, at 4-7 (Feb. 25, 2019); Comments of T-Mobile USA, Inc., at 5-7 (Feb. 8, 2019).

encouraging the development of the Framework and emphasizing its flexible and evolving nature, the Commission has helped to develop critical tools to advance continuity of service and expedite service restoration.

In contrast, imposing rigid mandates and metrics would be counterproductive. There is no "one-size-fits-all" solution to resiliency, and there should be no one-size-fits-all mandate or metric to assess the efficacy of the Framework.[49] The Commission recognized as much less than three years ago when it unanimously adopted the *Mobile Wireless Resiliency Order*, which embraced the Framework's flexible approach, rather than a set of prescriptive regulations.[50] In rejecting the prescriptive approach, the Commission cited to "the substantial concerns identified in the record with respect to the proposed metrics…."[51] Then-Commissioner Pai praised the decision as the "right step" and reiterated his opinion that the Commission should "focus on encouraging carriers to continue to invest in strengthening their networks."[52]

Despite this recent rejection of a metrics-focused approach, the Public Notice poses a number of questions about a host of potential measurables.[53] Such metrics would not achieve the desired result of promoting resiliency efforts by wireless providers. Rather, data collected through such reporting requirements would provide incomplete and potentially misleading information on the effectiveness of various prongs of the Framework.

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[49] *See* CTIA Comments, at 14-17 (July 16, 2018).

[50] *See Mobile Wireless Resiliency Order*.

[51] *Id.* at ¶ 1.

[52] Statement of Commissioner Ajit Pai, FCC 16-173 (Dec. 20, 2016) (regarding *Mobile Wireless Resiliency Order*).

[53] *See*, *Public Notice* at Sec. B ("What metrics would be most useful in evaluating the effectiveness of the Signatories' roaming during disaster commitments?"), at Sec. C ("How can we measure the extent that providers delivered, sought, or received mutual aid during emergencies and the effectiveness of such mutual aid"), at Sec. D ("How does one measure the extent to which Signatories are implementing the industry best practices and how communities leverage best practices or not?").

First, many of the Framework's prongs cannot be assessed without considering the context of other efforts to maintain and restore wireless services. As explained above, the Framework builds on other investments made by wireless providers to harden networks and develop practices and procedures to promote resiliency. For example, any "standardized way" of measuring the provisioning of mutual aid would overlook activities that enhance each provider's individual preparedness, and thus a mutual aid litmus test would be of limited utility in assessing the effectiveness of this prong of the Framework. Moreover, a standardized metric measuring the effectiveness of mutual aid likely would suffer from other flaws, including questions about what constitutes "effectiveness" of mutual aid.

Second, standardized metrics will inherently fail to recognize that each natural disaster or emergency is a unique event that can impact communities in vastly different ways. Experiences in response to Hurricane Michael demonstrate this point. The advanced notice of Hurricane Michael's arrival, combined with efforts by wireless providers to pre-position resources in nearby staging areas, resulted in little need for formal mutual aid. By comparison, the fostering of mutual aid was critical during and after Hurricane Maria. For example, due to the massive damage to the electric grid in Puerto Rico, wireless providers had to move generators and massive amounts of fuel to the island, often through damaged ports and staging yards and then to remote locations where road access was limited. In situations such as these, the provisioning of mutual aid played a big part in the restoration of service activities. However, the distinctions between the experience in Hurricane Michael and Hurricane Maria are lost if a rigid metric is appended to the flexible framework used to respond to these unique events.

And third, burdensome reporting requirements may chill future participation in the Framework by additional wireless providers. The Commission should avoid imposing burdens that make voluntary frameworks less inviting.

The *Public Notice's* questions related to the types of metrics that would be most useful in evaluating the effectiveness of roaming under disaster arrangements pose similar challenges. As CTIA previously explained, wireless providers typically rely on existing commercial roaming arrangements when networks are affected by a disaster or emergency.[54] Yet, the record indicates that disaster-based roaming arrangements have been utilized as well.[55] And although roaming arrangements raise complex technical issues, CTIA is not aware that any party has been denied a request for disaster-based roaming. In light of this record, there is no compelling public interest rationale to pursue metric reporting requirements or additional mandates.

The Bureau should similarly refrain from recommending proposals for back-up systems as "additions" to the Framework. CTIA previously has documented the challenges involved in supplying backup power to all cell sites, and virtually all of these challenges apply to other forms of back-up systems, such as microwave links and other temporary assets. Continuing to facilitate wireless providers' abilities to implement innovative solutions that take into consideration the unique aspects of each disaster and each individual network is a more effective approach. Policies promoting resiliency are best served by ensuring providers retain the flexibility to make

[54] *See* CTIA Comments, PS Docket No. 18-339, at 13 (Dec. 17, 2019).

[55] *See, e.g.*, AT&T Resiliency Response, App. at 45 (noting AT&T granted a request for roaming under disaster in the days following Hurricane Michael's landfall); AT&T Resiliency Response at 28 (noting that AT&T granted several requests for voice and short message service (SMS) roaming in the aftermath of Hurricane Maria); T-Mobile Resiliency Response at 13 (noting that T-Mobile granted a request for roaming under disaster arrangement in the aftermath of Hurricane Maria).

judgments about what solutions make the most sense given the needs of diverse network configurations.

VI. CONCLUSION.

CTIA shares the Commission's commitment towards advancing wireless network resiliency. Previous investments by the wireless industry to enhance resiliency combined with the flexible tools identified in the Framework helped to advance service continuity, expedite service restoration, and improve information sharing during the 2017 and 2018 hurricanes. Yet, CTIA recognizes that resiliency represents an ongoing endeavor. CTIA is committed to identifying targeted improvements moving forward and looks forward to working collaboratively with the Commission to continue to advance policies that encourage investment in wireless network resiliency.

Respectfully submitted,

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